



## THE NATIONAL INFRASTRUCTURE SIMULATION AND ANALYSIS CENTER (NISAC): A New Contributor to Strategic Leader Education and Formulation of Critical Infrastructure Policies and Decisions

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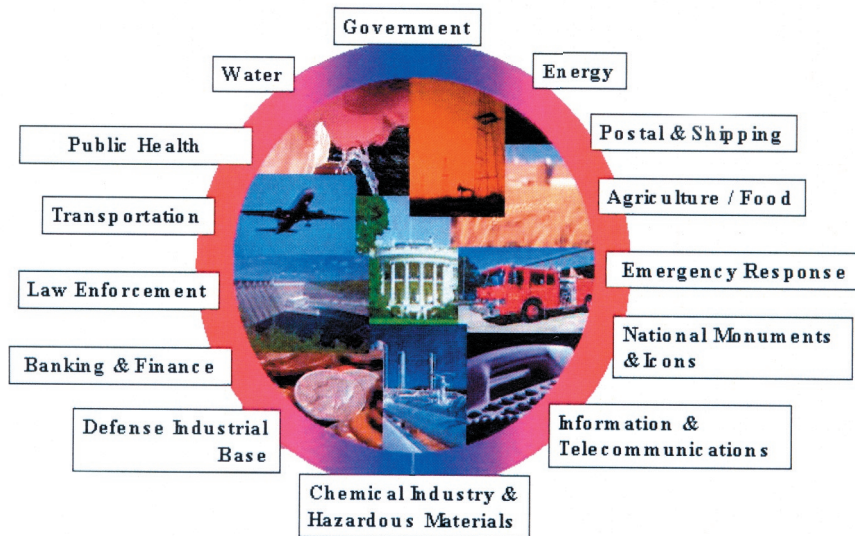


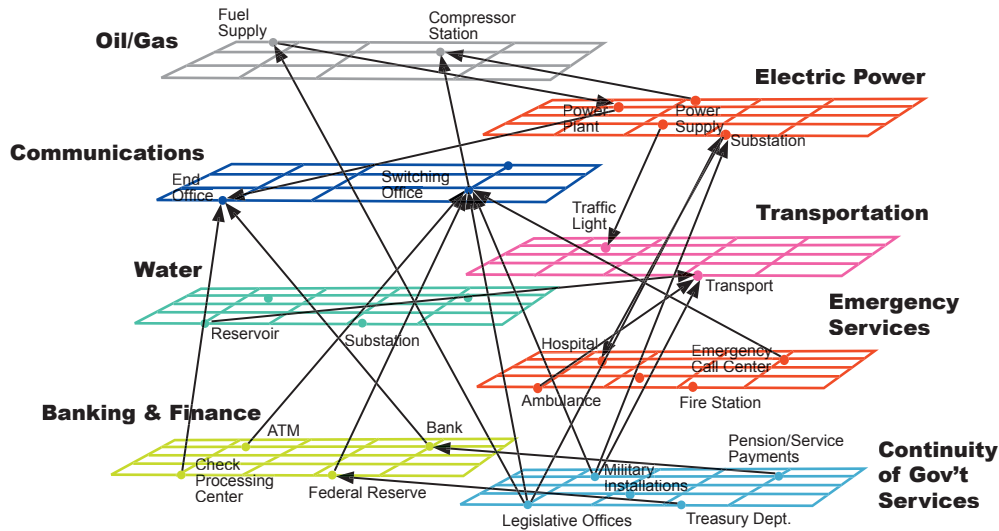
Figure 1. National Critical Infrastructure Assets

### The National Infrastructure Simulation and Analysis Center (NISAC):

With the collapse of the World Trade Center Towers, many national policy makers feared the financial markets would follow, causing a cascading breakdown of other critical infrastructure assets. Fortunately, our worst nightmare failed to materialize, but the need to protect and to better understand our nation's critical assets was unmistakable. The clarion from the 9/11 terrorist's attack calls for strategic leaders to understand the complexity, interdependency, and vulnerability of our infrastructure. The National Infrastructure Simulation and Analysis Center (NISAC) provides an unparalleled modeling, simulations, and analysis capability to assist the military's Senior Service College (SSC) community in educating future strategic leaders about the realities of the Nation's infrastructure system and in researching the effects that new government security policies and actions would have on the nation's critical assets and public and private sector services. For example, a policy affecting increased security at all west coast sea ports could have devastating second and third order effects on regional and national commerce, transportation, labor, energy, banking, and so forth; a series of terrorist acts could have similar effects.

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## Complications: Interdependencies and Organizational Boundaries



**Figure 2. Complications, Interdependencies and Organizational Boundaries of the Nation's Critical Infrastructures**

### Who is NISAC?

NISAC is based at Sandia National Laboratories and has project operations at Los Alamos as well. The agency leverages a host of capabilities from major academic institutions and DOD contractors. The NISAC has been realigned under the Asset Identification Branch within the Department of Homeland Security (HLS) as of March 1, 2003.

The work of NISAC captures the robustness of our nation's critical infrastructure for the decision makers in the areas of policy analysis, investment and mitigation planning, education and training, and real-time assistance to crisis response organizations. For strategic level education, NISAC can assist the Military's SSCs in three areas:

1. Provide simulations that produce accurate forecasts/outcomes for potential policy and regulatory decisions made during exercises, workshops, and seminars.
2. Produce feasible simulation outcomes to drive realistic exercise scenario development.
3. Support classroom studies on homeland security issues.

### Simulations for Student Policy Analysis and Exercise Scenario development

For national or regional level exercises, several NISAC simulations and tools are ideally suited to assist students researching short- or long-term effects of national regulatory laws policies, responses, or actions, exploring infrastructure vulnerabilities or identifying second and third order effects of attacks or disruption. NISAC simulations could also stand as the basis for writing new exercise scenarios by providing a valid and realistic foundation for scenario sequenced or sequel events due to an infrastructure disruption. The results could be incorporated into strategic exercises and senior level experiential learning events such as the U.S. Army War College's annual Strategic Crisis Exercise (SCE).

The NISAC Agent-Based Laboratory For Economics (N-ABLE) has great potential to fulfill these requirements. N-ABLE is a consequence management tool that can provide analysis for the economic play during SCE. The model simulates the microeconomic impact on specific firms, industries or sectors when a disruption or a change in a government policy occurs. Sectors/infrastructure modeled both regionally and nationally are electric power, telecommunications, manufacturing, and transportation. The model can capture the complexities of a single market or an entire economic region.

### Supporting Classroom Senior leader Education on Homeland Security Issues

Other NISAC simulations are specifically designed to support small group analysis of “what if” scenarios. Led by the instructor, small groups could discover if they had considered all ramifications of a policy decision or action. By running the group’s policy decision data in simulation, the students could gain a realistic perspective and experience how a policy or action could create unintended consequences. Similar processes could be used to determine critical infrastructure vulnerabilities, interdependencies, and impacts of an attack.

NISAC has several “stand alone” simulations that could be exported to the classroom today. The “California Oil Simulator” and “Portland Oregon Port Simulator” are two infrastructure models ready for the classroom. Both simulators are constructed to promote group discussions and analysis for a specific scenario. For example, if a class is evaluating the strategic impact of a disruption—whether it is a port closure or fuel rationing. Both simulations use a graphical user interface (GUI) that makes setting up the scenario intuitively easy. Each simulation produces comprehensive graphical charts and tables for the group to analyze. Both models are small enough to fit on most current PC desktop and laptop computers.

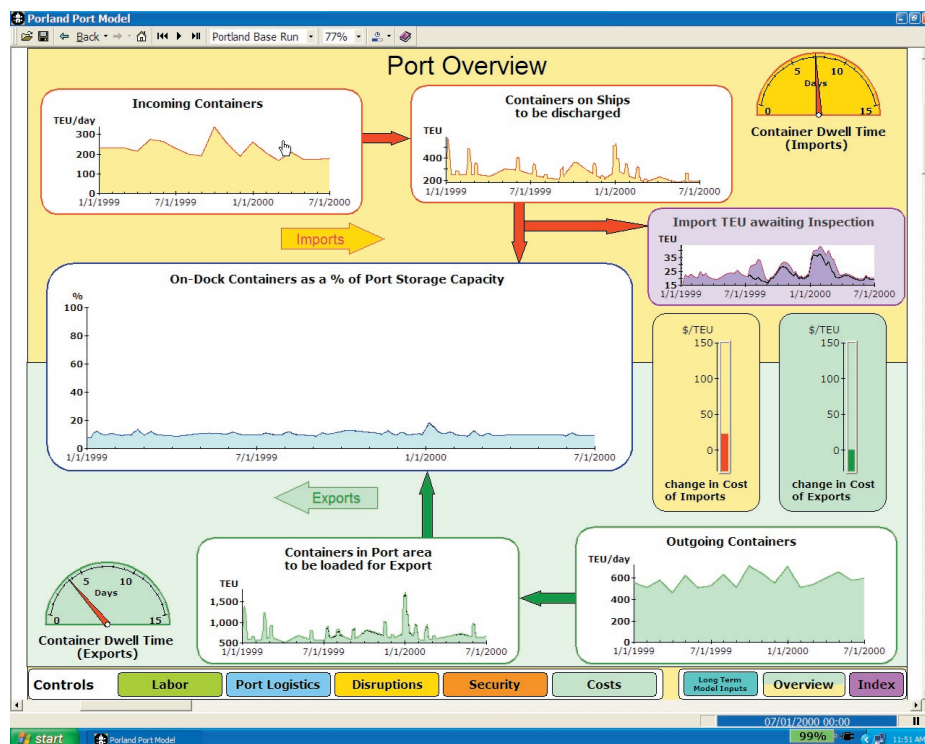


Figure 3. A screen shot of one GUI available in the Oregon Port Simulator

*Consequences from Using Higher Scanning and Inspection Rate of imported containers During High Alert and Certain Seasonal Periods at Portland.*

## The Future

NISAC's analysts are continually enhancing the model's fidelity or tailoring it to study specific issues. Currently, NISAC models focus on local and regional warnings and indicators, interdependencies, cascading effects, impacts, and implications. Most of the data collected to date centers on the west and northwest regions of the United States. Many of the products will be expanded to include other regional and national analytical capabilities. Forging new collaborations with key private sector, academic, and government organizations will mutually benefit NISAC and its partners in providing the nation's current stakeholders and future leaders the most advanced infrastructure interdependency analyses and tools available to address key Homeland Security issues. Now is an optimum time for the Military SSCs and other academic institutions to explore the potential of using NISAC's evolving simulations and modeling to assist classroom and experiential learning.

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